

REMARKS

Status of the Claims

Claims 1- 2, 5, 7-11, 13-14, 16-19, 23-24, 26-27, 29-33, 35-36, 38-42, 44-45, 47-51, 53-54, and 56-65 are presently pending. By this Amendment, claims 3, 25, 34, 43, and 52 have been cancelled. Claims 1, 10, 13, 19, 23, 26, 32, 35, 41, 44, 50, 53, 60, and 62 have been amended. Support for these amendments can be found in the originally filed claims and throughout the original specification. No new matter has been added.

Applicants thank the Examiner for withdrawing the rejection under 35 USC §103(a) over Cunningham.

Applicants also thank the Examiner for acknowledging that the cited art of record fails to teach or suggest the claimed oxygenate compounds of claims 62 and 63, and that such claims would be allowable if rewritten in independent form.

Rejections Under 35 USC § 103

Schwab in view of Lin

The Examiner has rejected claims 1, 3-5, 7-11, 13, 14, 16-18, 23-27, 29-36, 38-45, 47-54 and 56-61 under 35 U.S.C. §103 as being unpatentable over U.S. Patent No. 5,669,938 ("Schwab") in view of U.S. Patent No. 6,458,173 ("Lin"), for the reasons provided at pages 2-4 of the outstanding Office Action. Applicants respectfully traverse this rejection for at least the reasons of record, as well as those presented below. Claims 3, 25, 34, 43, and 52 have been cancelled, thereby rendering their rejections moot.

To establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, not in applicant's disclosure. *In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991). See M.P.E.P. § 2143.

Independent claims 1, 23, 32, and 50 each recite a method comprising, among other things, providing a middle distillate fuel blended with one or more oxygenates selected from the group consisting of the following: dimethyl ether (DME), butyl ether, amyl ether, di-n-butyl ether, glyme polyethers, diethylene glycol methyl ether (DGME), triethylene glycol dimethyl ether (triglyme), diethylene glycol dimethyl ether (diglyme), 1,2-dimethoxyethane (glyme), Cetaner (a blend of 96% glyme and 4% dimethoxymethane), ethylene glycol mono-tert-butyl ether, ethylene glycol mono-n-butyl ether, carbonates, dimethyl carbonate and diethyl carbonate; di-acetates, ethylene glycol acetate; acetals, dimethoxymethane (DMM or methyl-al), 2-ethylhexylacetate; esters of plant and animal oils, methyl soyate, alcohols, aldehydes, carboxylic acids and esters thereof, and mixtures of one or more of the foregoing.

Independent claims 10 and 60 each recite a composition comprising, among other things, an oxygenate selected from the group consisting of the following: dimethyl ether (DME), butyl ether, amyl ether, di-n-butyl ether, glyme polyethers, diethylene

glycol methyl ether (DGME), triethylene glycol dimethyl ether (triglyme), diethylene glycol dimethyl ether (diglyme), 1,2-dimethoxyethane (glyme), Cetaner (a blend of 96% glyme and 4% dimethoxymethane), ethylene glycol mono-tert-butyl ether, ethylene glycol mono-n-butyl ether, carbonates, di-acetates, ethylene glycol acetate, acetals, 2-ethylhexylacetate, methanol, isopropanol, butanol, ketones, and mixtures of one or more of the foregoing.

The Examiner has admitted that "*Schwab* differs from the claims in that he does not exemplify a fuel composition wherein the oxygenates is blended with the fuel." See page 3 of the outstanding Office Action. But, the Examiner has argued that "*Schwab* teaches that the finished fuels may contain blending agents such as dialkyl ethers," and therefore, this teaching allegedly suggests the combination. *Id.*

Applicants respectfully submit that *Schwab* does not teach or suggest the particular oxygenates presently claimed. Such a broad and general description of "dialkyl ethers" is simply insufficient to motivate one skilled in the art to particularly select the presently claimed ethers (e.g., dimethyl ether (DME), butyl ether, amyl ether, di-n-butyl ether, glyme polyethers, diethylene glycol methyl ether (DGME), triethylene glycol dimethyl ether (triglyme), diethylene glycol dimethyl ether (diglyme), ethylene glycol mono-tert-butyl ether, ethylene glycol mono-n-butyl ether), much less teach or suggest any of the other non-ether oxygenates (e.g., Cetaner (a blend of 96% glyme and 4% dimethoxymethane), carbonates, dimethyl carbonate and diethyl carbonate; di-acetates, ethylene glycol acetate; acetals, dimethoxymethane (DMM or methyl-al), 2-ethylhexylacetate; esters of plant and animal oils, methyl soyate, alcohols, aldehydes, carboxylic acids and esters thereof, and mixtures of one or more of the foregoing).

Furthermore, none of the Examples in *Schwab* utilize any of the above oxygenates in its fuel formulations.

The Examiner has relied upon the theory of inherency to argue that "the discovery of a previously unappreciated property of a prior art composition does not render the old composition patentable to the discoverer." See page 3-4 of the outstanding Office Action. However, "[i]n relying upon the theory of inherency, the examiner must provide a basis in fact and/or technical reasoning to reasonably support the determination that the allegedly inherent characteristic necessarily flows from the teachings of the applied prior art." *Ex parte Levy*, 17 USPQ2d 1461, 1464 (Bd. Pat. App. & Inter. 1990) (emphasis in original). The fact that a certain result or characteristic may occur or be present in the prior art is not sufficient to establish the inherency of that result or characteristic. *In re Rijckaert*, 9 F.3d 1531, 1534, 28 USPQ2d 1955, 1957 (Fed. Cir. 1993).

As discussed in the present disclosure at page 7, oxygenates such as those listed above can be blended into middle distillate fuels to lower particulate emissions; however, they are prone to autooxidation in the presence of oxygen to form peroxides. Peroxide-laden fuels can raise serious concerns, such as posing as an explosion hazard in ambient storage and handling conditions. Thus, reducing the amount of peroxide in middle distillate fuels is highly desirable, and the present invention teaches the use of a hydrocarbon additive to achieve such a goal. The hydrocarbon additive acts as a radical sink and traps hot radicals to shut off peroxide generation. See pages 4-8 of the present specification. The hydrocarbon additive comprises a polar functional group and a tertiary hydrogen beta to the functional group, described by the formula

$R_1R_2CH-CH_2-X$, wherein X is the polar functional group, and R_1 and R_2 are different alkyl groups of carbon chain length of from two to about thirty carbon atoms appended to the carbon molecule beta to the polar functional group.

As argued above, *Schwab* discloses that "dialkyl ethers" can be used as blending agents yet none of the Examples utilize any oxygenates or dialkyl ethers, much less the particular oxygenates presently claimed. Thus, at most, *Schwab* teaches that dialkyl ethers may be present in middle distillate fuel compositions comprising an organic nitrate. However, the reference does not teach or suggest that 2-ethylhexyl nitrate would necessarily reduce peroxide formation by acting as a radical sink and trapping hot radicals formed by dialkyl ethers reacting with oxygen, especially because dialkyl ethers are taught as a peripheral component of its disclosed composition. One skilled in the art would only arrive at this conclusion by considering the present teachings. Therefore, *Schwab* clearly does not teach or suggest the presently claimed method for reducing peroxides, and the Examiner is using impermissible hindsight to construct the obviousness rejection.

Furthermore, each of claims 1, 10, 23, 32, 41, 50, and 60 recite that "the fuel has a sulfur content of about 20 ppm or less. The Examiner admits that no such limitation is taught by *Schwab* and has supplied *Lin* to allegedly teach this missing teaching. However, *Lin* fails to teach or suggest the presently claimed oxygenates and thus do not overcome the deficiencies of *Schwab*.

Moreover, *Lin* does not teach reducing peroxides, as in claim 1, or peroxide concentrations in the fuel of less than about 8 ppm, as in claims 10, 23, 32, 41 and 50. Rather, *Lin* is directed to fuel additives that can act as both as detergents and as

lubricity additives. *Lin*, Column 1, Summary. Because the claimed hydrocarbon additive comprising a polar functional group and a tertiary hydrogen beta to the functional group is not recognized by either *Schwab* or *Lin* for reducing peroxides, there is no motivation for combining the hydrocarbon additive with a middle distillate fuel to reduce peroxides.

For at least these reasons, every limitation of the claims is not taught. Accordingly, no *prima facie* case of obviousness has been established, and the rejection should be withdrawn.

Yeh

The Examiner has rejected claims 1-3, 5, 7, 8, 10, 11, 13, 14, 16, 17, 23-27, 29, 30, 32-36, 38, 39, 41-45, 47, 48, 50-54, 56, 57 and 59 are rejected under 35 U.S.C. §103 (a) as being unpatentable over U.S. Patent No. 6,447,557 ("Yeh"), for the reasons provided at pages 4-5 of the outstanding Office Action. Applicants respectfully traverse this rejection. Claims 3, 25, 34, 43, and 52 have been cancelled, thereby rendering their rejections moot.

The Examiner has argued that *Yeh* teaches that the addition of at least one of an alcohol, ketone or mixture thereof to an ultra-low sulfur diesel reduces particulate emissions. *Id.* at page 4. The Examiner has further argued that an alcohol (2-ethylhexanol) allegedly represents Applicant's hydrocarbon additive, and the ketone allegedly represents Applicant's oxygenate. While Applicants vigorously disagree, in order to advance prosecution, independent claims 1, 10, 23, 32, and 50 have been amended to remove recitation of ketone.

Applicants believe that the exclusion of ketones from the claimed oxygenates is fully supported by the specification as filed. Applicants are simply claiming less than the full scope of their disclosure — a perfectly legitimate exercise since it is for the inventors to decide what bounds of protection they will seek. *See In re Johnson*, 194 USPQ 187 (C.C.P.A. 1977).

Regarding claim 1, the Examiner has argued that it would be reasonable to expect that the fuel composition of *Yeh* would reduce the amount of peroxides because *Yeh* teaches a low sulfur fuel wherein an oxygenate and the claimed hydrocarbon additive may be present. Citing *Ex parte Obiaya*, the Examiner alleges that the benefit of reducing the amount of peroxides would have naturally flowed from the suggestions of *Yeh*.

However, for the reasons discussed above, *Yeh* neither teaches nor suggests the presently claimed composition. The compositions taught by *Yeh* do not contain both the claimed oxygenate and a hydrocarbon additive comprising a polar functional group and a tertiary hydrogen beta to the functional group. Instead, *Yeh* merely teaches a fuel composition comprising a major amount of a base fuel having no more than 50 ppm by weight of sulfur; and at least 1% by weight of an oxygenate. However, *Yeh* fails to teach or suggest the presently claimed oxygenates. Moreover, there is nothing in *Yeh* that would either suggest, or inherently result in, a reduction in peroxides. Furthermore, *Yeh* does not teach or suggest employing a hydrocarbon additive comprising a polar functional group and a tertiary hydrogen beta to the functional group in a composition having an oxygenate and the specifically claimed sulfur concentrations. Accordingly, Applicants' use of the specifically claimed hydrocarbon additive and oxygenate in a

method to reduce peroxides in fuel compositions having sulfur concentrations of 20 ppm or that contain an oxygenate is thus not taught or suggested.

Regarding claims 10-14, 16, 17, 23-24, 26-27, 29, 30, 32-33, 35-36, 38-39, 41-42, 44-45, 47, 48, 50-51, 53-54, 56, 57 and 59, these claims recite a sulfur concentration of 8 ppm or less. According to the Examiner, it would be reasonable to expect that the fuel composition meets this limitation because *Yeh* teaches a similar fuel with the claimed additives.

However, as discussed above, for a reference to inherently provide a claimed limitation, the limitation must necessarily flow from the teachings of the reference. For the above reasons, *Yeh* does not teach or suggest the claimed composition. None of the examples of *Yeh* employ the claimed hydrocarbon additive comprising a polar functional group and a tertiary hydrogen beta to the functional group. *Yeh* further fails to teach or suggest the presently claimed oxygenate. Accordingly, *Yeh* fails to teach or suggest every element of the claimed invention, much less provide any evidence that the compositions of *Yeh* would necessarily result in the claimed peroxide concentrations. Therefore, *Yeh* does not inherently teach the claimed sulfur concentrations. Without some teaching or suggestion of the claimed sulfur concentration, inherent or otherwise, no *prima facie* case of obviousness exists. For this additional reason, the rejections should be withdrawn.

U.S. Patent No. 6,080,212

The Examiner has rejected claims 1-3, 5, 7-11, 13, 14, 17-19, 23-27, 29-36, 38-45, 47-54, 56-61, 64, and 65 are rejected under 35 U.S.C. §103 (a) as being unpatentable over U.S. Patent No. 6,080,212 ("Beimesch"), for the reasons provided at

pages 5-6 of the outstanding Office Action. Applicants respectfully traverse this rejection. Claims 3, 25, 34, 43, and 52 have been cancelled, thereby rendering their rejections moot.

The Examiner has argued that *Beimesch* teaches a low sulfur diesel fuel wherein the sulfur content is less than 0.1% by weight. *Id.* at page 6. The Examiner has further argued that the fuel comprises a combination of at least two esters, which allegedly represent Applicant's oxygenate. The compositions may also contain polyethylene glycol ethers, which may also allegedly represent the claimed oxygenate. *Id.*

However, as discussed above, independent claims 1, 10, 23, 32, and 50 recite an oxygenate selected from the group consisting of the following: dimethyl ether (DME), butyl ether, amyl ether, di-n-butyl ether, glyme polyethers, diethylene glycol methyl ether (DGME), triethylene glycol dimethyl ether (triglyme), diethylene glycol dimethyl ether (diglyme), 1,2-dimethoxyethane (glyme), Cetaner (a blend of 96% glyme and 4% dimethoxymethane), ethylene glycol mono-tert-butyl ether, ethylene glycol mono-n-butyl ether, carbonates, dimethyl carbonate and diethyl carbonate; di-acetates, ethylene glycol acetate; acetals, dimethoxymethane (DMM or methyl-al), 2-ethylhexylacetate; esters of plant and animal oils, methyl soyate, alcohols, aldehydes, carboxylic acids and esters thereof, and mixtures of one or more of the foregoing. A simple recitation of general "polyethylene glycol ethers" is insufficient to motivate one skilled in the art to particularly select the presently claimed ethers (e.g., dimethyl ether (DME), butyl ether, amyl ether, di-n-butyl ether, glyme polyethers, diethylene glycol methyl ether (DGME), triethylene glycol dimethyl ether (triglyme), diethylene glycol dimethyl ether (diglyme), ethylene glycol mono-tert-butyl ether, ethylene glycol mono-

butyl ether), much less teach or suggest any of the other non-ether oxygenates (e.g., Cetaner (a blend of 96% glyme and 4% dimethoxymethane), carbonates, dimethyl carbonate and diethyl carbonate; di-acetates, ethylene glycol acetate; acetals, dimethoxymethane (DMM or methyl-al), 2-ethylhexylacetate; esters of plant and animal oils, methyl soyate, alcohols, aldehydes, carboxylic acids and esters thereof, and mixtures of one or more of the foregoing). Furthermore, none of the Examples in *Beimesch* utilize any of the above oxygenates in its exemplary formulations.

Moreover, *Beimesch* literally teaches thousands of possible conventional additives, nearly none of which are Applicants' claimed hydrocarbon additive. In particular, one of ordinary skill in the art would have to make the unlikely selection of a single, particular nitrate (i.e., 2-ethylhexyl nitrate) from among the many possible choices, including: nitro and nitroso compounds; peroxides; hydroperoxides; straight chain ethers; and a vast multitude of varied stability additives, metal deactivators, dispersants detergents, corrosion inhibitors, biocides, antifoam agents, demulsifiers, smoke suppression agents, pour point depressants, extreme pressure additives, antifoaming agents, oxidation inhibitors, etc., even though no such fuel comprising 2-ethylhexyl nitrate is specifically taught or exemplified.

Thus, given the very small chance of choosing Applicants' specifically claimed hydrocarbon additive, and the failure of *Beimesch* to particularly teach or suggest Applicants' claimed oxygenate, and the combination of ingredients, there would not have been sufficient motivation for arriving at the presently claimed invention from the teachings of *Beimesch*.

For at least these reasons, every limitation of the claims is not taught. Accordingly, no *prima facie* case of obviousness has been established, and the rejection should be withdrawn.

CONCLUSION

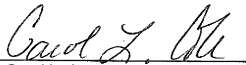
In view of the foregoing amendments and remarks, Applicants submit that this claimed invention is not rendered obvious in view of the cited art references. Applicants therefore request the entry of this Amendment, the Examiner's reconsideration of the application, and the timely allowance of the pending claims.

Please grant any extensions of time required to enter this response and charge any additional required fees to our deposit account 50-2961.

Respectfully submitted,

Dated: July 30, 2008

By: _____



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